

AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application.

LISTING OF CLAIMS:

1. (Cancelled)

2. (Currently Amended) The component of claim 4, wherein the component comprises a bulk acoustic resonator that operates with bulk acoustic waves; and

resonator of claim 1, wherein thicknesses of the dielectric layer and the metal layer are in a range of a quarter wavelength of the bulk acoustic waves or in a range of an odd multiple of the quarter wavelength.

3. (Cancelled)

4. (Previously Presented) A component comprising:

a plurality of resonators that form at least a portion of a circuit;

wherein the plurality of resonators comprise[[:]] a wafer layer structures above a the wafer,[[[:]] wherein each of the layer structures comprises first and second electrode layers that comprise electrodes, and at least one piezoelectric layer that is between the first and second electrode layers;

a dielectric layer above the plurality of resonators layer-structures, the dielectric layer comprising a hermetic encapsulation for the plurality of resonators, the dielectric layer comprising a material and having a thickness that result results in a first acoustic impedance; and

a metal layer above the dielectric layer, the metal layer comprising a material and having a thickness that result results in a second acoustic impedance, the second acoustic impedance being higher than the first acoustic impedance, the metal layer and the dielectric layer being parts of an acoustic mirror;

~~wherein each of the layer-structures comprises first and second electrode layers that comprise electrodes, and at least one piezoelectric layer that is between the first and second electrode layers~~

wherein the dielectric layer is above substantially an entire surface of the wafer, and wherein a top surface of the dielectric layer is substantially planar and thicknesses of the dielectric layer to implement the acoustic mirror are above the plurality of resonators; and

wherein the material for the dielectric layer comprises a low-k dielectric, the low-k dielectric comprising at least one of an aerogel, a porous silicate, an organosilicate, a siloxane derived from condensed silsesquioxanes, a polyaromatic compound, a cross-linked polyphenylene, and a polymerized benzocyclobutene.

5. (Previously Presented) The component of claim 4, wherein the dielectric layer comprises an organic layer.

6. (Currently Amended) The component of claim 22 5, wherein the dielectric layer comprises benzocyclobutenes.

7. (Currently Amended) The component of claim 23 [[4]], wherein the dielectric layer is over substantially an entire surface of the wafer and over the plurality of resonators, a top surface of the dielectric layer being substantially planar such that thicknesses of the dielectric layer needed to implement the acoustic mirror are over the plurality of resonators.

8. (Withdrawn) The component of claim 4, further comprising:
active or passive circuit elements on or within the wafer and integrated with the plurality of resonators into one or more circuits, wherein layers forming the acoustic mirror comprise an encapsulation for the active or passive circuit elements and the plurality of resonators.

9. (Withdrawn) The component of claim 8, wherein the plurality of resonators and the active or passive circuit elements comprise parts of a circuit on the wafer, the circuit comprising one or more of a high-frequency circuit, an adaptation circuit, an antenna circuit, a diode circuit, a transistor circuit, a highpass filter, a lowpass filter, a bandpass filter, a filter having a tunable frequency, a power amplifier, a preamplifier, an LNA, a diplexer, a duplexer, a multfilter, a coupler, a directional coupler, a memory element, a balun, a mixer, and an oscillator.

10. (Previously Presented) An apparatus comprising:

plural components according to claim 4.

11. (Cancelled)

12. (Previously Presented) The component of claim 4, wherein the metal layer comprises at least one of tungsten (W), molybdenum (Mo), gold (Au) and aluminum nitride (AlN).

13. (Currently Amended) The component of claim ~~22~~ 14, wherein the low-k dielectric comprises at least one of an aerogel, a porous silicate, an organosilicate, a siloxane derived from condensed silsesquioxanes, a polyaromatic compound, a cross-linked polyphenylene, and a polymerized benzocyclobutene.

14. (Previously Presented) The component of claim 4, wherein the wafer has a surface comprising solderable contacts that are electrically connected to the plurality of resonators or to one or more of a plurality of active and/or passive components integrated with the plurality of resonators in circuits.

15. (Previously Presented) The component of claim 4, wherein the wafer has an underside that comprises solderable connecting terminals, the solderable connecting terminals being electrically connected to the plurality of resonators or to one or more of a plurality of

active and/or passive components integrated in circuits with the plurality of resonators via feed-throughs in the wafer.

16. (Previously Presented) The component of claim 4, wherein the component comprises a bulk acoustic wave resonator, a stacked crystal filter, or a coupled resonator filter.

17. (Previously Presented) The component of claim 4, wherein the acoustic mirror comprises at least one other layer pair arranged above the metal layer, the at least one other layer pair comprising a layer of relatively low acoustic impedance and a layer of relatively high acoustic impedance.

18. (Currently Amended) The resonator of claim 21 4, wherein the dielectric material comprises a low-k dielectric comprising at least one of an aerogel, a porous silicate, an organosilicate, a siloxane derived from condensed silsesquioxanes, a polyaromatic compound, a cross-linked polyphenylene, and a polymerized benzocyclobutene

19. (Currently Amended) The resonator of claim 4 4, wherein the metal layer comprises at least one of tungsten (W), molybdenum (Mo), gold (Au) and aluminum nitride (AlN).

20. (Currently Amended) The resonator of claim 4 4, wherein the wafer has a surface comprising solderable contacts that are electrically connected to the resonator or to one or more of a plurality of active and/or passive components.

21. (Currently Amended) A component comprising:

a plurality of resonators that form at least a portion of a circuit;

wherein the plurality of resonators comprise layer structures above a wafer, wherein each of the layer structures comprises first and second electrode layers that comprise electrodes, and at least one piezoelectric layer that is between the first and second electrode layers;

a dielectric layer above the plurality of resonators, the dielectric layer comprising a hermetic encapsulation for the plurality of resonators, the dielectric layer comprising a material and having a thickness that results in a first acoustic impedance; and

a metal layer above the dielectric layer, the metal layer comprising a material and having a thickness that results in a second acoustic impedance, the second acoustic impedance being higher than the first acoustic impedance, the metal layer and the dielectric layer being parts of an acoustic mirror;

wherein the dielectric layer is above substantially an entire surface of the wafer, and wherein a top surface of the dielectric layer is substantially planar and thicknesses of the dielectric layer to implement the acoustic mirror are above the plurality of resonators; and

The component of claim 4, wherein the plurality of resonators are electrically interconnected by electrode layers of the resonators to form the at least a portion of a circuit.

22. (New) A component comprising:

a plurality of resonators that form at least a portion of a circuit;

wherein the plurality of resonators comprise layer structures above a wafer, wherein each of the layer structures comprises first and second electrode layers that comprise electrodes, and at least one piezoelectric layer that is between the first and second electrode layers;

a dielectric layer above the plurality of resonators, the dielectric layer comprising a hermetic encapsulation for the plurality of resonators that comprises a termination of the dielectric layer outside of the plurality resonators and above an upper surface of the wafer, the dielectric layer comprising a material and having a thickness that results in a first acoustic impedance, the dielectric layer comprising an organic layer, the dielectric layer substantially following a topology of the plurality of resonators;

a metal layer above the dielectric layer, the metal layer comprising a material and having a thickness that results in a second acoustic impedance, the second acoustic impedance being higher than the first acoustic impedance, the metal layer and the dielectric layer being parts of an acoustic mirror;

wherein the dielectric layer is above substantially an entire surface of the wafer, and wherein a top surface of the dielectric layer is configured so that thicknesses of the dielectric layer needed to implement the acoustic mirror are above the plurality of resonators; and

wherein the plurality of resonators are electrically interconnected by electrode layers of the resonators to form the at least a portion of a circuit.

23. (New) A component comprising:

a plurality of resonators that form at least a portion of a circuit;

wherein the plurality of resonators comprise layer structures above a wafer, wherein each of the layer structures comprises first and second electrode layers that comprise electrodes, and at least one piezoelectric layer that is between the first and second electrode layers;

a dielectric layer above the plurality of resonators, the dielectric layer comprising a hermetic encapsulation for the plurality of resonators, the dielectric layer comprising a material and having a thickness that results in a first acoustic impedance, the material comprising a low-K dielectric; and

a metal layer above the dielectric layer, the metal layer comprising a material and having a thickness that results in a second acoustic impedance, the second acoustic impedance being higher than the first acoustic impedance, the metal layer and the dielectric layer being parts of an acoustic mirror;

wherein the wafer has a surface comprising solderable contacts that are electrically connected to the plurality of resonators or to one or more of a plurality of active and/or passive components integrated with the plurality of resonators in circuits; and

wherein the plurality of resonators are electrically interconnected by electrode layers of the resonators to form the at least a portion of a circuit.

24. (New) The component of claim 23, wherein the low-k dielectric comprises at least one of an aerogel, a porous silicate, an organosilicate, a siloxane derived from condensed silsesquioxanes, a polyaromatic compound, a cross-linked polyphenylene, and a polymerized benzocyclobutene.

25. (New) The component of claim 21, wherein the component comprises a bulk acoustic resonator that operates with bulk acoustic waves; and

wherein thicknesses of the dielectric layer and the metal layer are in a range of a quarter wavelength of the bulk acoustic waves or in a range of an odd multiple of the quarter wavelength.

26. (New) The component of claim 21, wherein the acoustic mirror comprises at least one other layer pair arranged above the metal layer, the at least one other layer pair comprising a layer of relatively low acoustic impedance and a layer of relatively high acoustic impedance.

27. (New) The component of claim 22, wherein the component comprises a bulk acoustic resonator that operates with bulk acoustic waves; and

wherein thicknesses of the dielectric layer and the metal layer are in a range of a quarter wavelength of the bulk acoustic waves or in a range of an odd multiple of the quarter wavelength.

28. (New) The component of claim 22, wherein the acoustic mirror comprises at least one other layer pair arranged above the metal layer, the at least one other layer pair comprising a layer of relatively low acoustic impedance and a layer of relatively high acoustic impedance.

29. (New) The component of claim 23, wherein the component comprises a bulk acoustic resonator that operates with bulk acoustic waves; and

wherein thicknesses of the dielectric layer and the metal layer are in a range of a quarter wavelength of the bulk acoustic waves or in a range of an odd multiple of the quarter wavelength.

30. (New) The component of claim 23, wherein the acoustic mirror comprises at least one other layer pair arranged above the metal layer, the at least one other layer pair comprising a layer of relatively low acoustic impedance and a layer of relatively high acoustic impedance.

31. (New) The component of claim 21, wherein the wafer has an underside that comprises solderable connecting terminals, the solderable connecting terminals being electrically connected to the plurality of resonators or to one or more of a plurality of active and/or passive components integrated in circuits with the plurality of resonators via feed-throughs in the wafer.

32. (New) The component of claim 22, wherein the wafer has an underside that comprises solderable connecting terminals, the solderable connecting terminals being electrically connected to the plurality of resonators or to one or more of a plurality of active and/or passive components integrated in circuits with the plurality of resonators via feed-throughs in the wafer.